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ABSTRACT

This curriculum packet, appropriate for grades 4-8, features a teaching poster which shows different types of maps (different views of Salt Lake City, Utah), as well as three reproducible maps and reproducible activity sheets which complement the maps. The poster provides teacher background, including step-by-step lesson plans for four geography and map reading lessons: (1) "Introduction to Maps"; (2) "Some Things You Need to Know to Read a Map"; (3) "What You Can Learn from a Map"; and (4) "Reading a Topographic Map." The packet suggests a variety of inquiry strategies that appeal to different learning styles. (BT)

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What do Maps Show?

Geological Survey (Dept. of Interior), Reston, Va.

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Teacher Background

The teaching poster with four accompanying lessons is appropriate for upper elementary and junior high school classes. The purpose of this teaching package is to help students understand and use maps. The U.S. Geological Survey (USGS) has provided this package as a service to educators so that more Americans will learn to understand the world of information on maps. Everything in this package teaches and reinforces geographic skills that are required in your curriculum.

This is a flexible resource unit. Included in this package are:

- A teaching poster
- Step-by-step lesson plans for four geography and map reading lessons:

Lesson 1—Introduction to Maps *(2, 30-minute sessions)*

Lesson 2—Some Things You Need to Know to Read a Map *(2, 30-minute sessions)*

Lesson 3—What You Can Learn from a Map *(2, 30-minute sessions)*

Lesson 4—Reading a Topographic Map *(3, 35-minute sessions)*

- Three reproducible maps from which you'll create a map packet for each student
- Reproducible activity sheets —one for each lesson
- A summary of the five geographic concepts as articulated by *Guidelines for Geographic Education, Elementary and Secondary Schools*, a publication of the Joint Committee on Geographic Education of the National Council for Geographic Education and the Association of American Geographers
- Basic information about the U.S. Geological Survey
- A list of materials for teachers available from USGS.

About the poster

The poster in this teaching package shows several views of the same place—Salt Lake City, Utah. It includes a large aerial view of the city with the mountains in the background. This is where your students begin—with the reality of a picture of a place.

The poster also shows some *symbolic* representations—maps and a digital elevation model—of the same area. This will help your students move from the concrete picture in the photo to the symbolic representation of a map. This is the most basic and necessary skill in helping students understand and use maps.

No map is meaningful if the viewer can't connect the symbols on the map to the reality of a place. For students in this age group, moving from reality to symbols is a major intellectual step and a critical part of the learning process.

The poster features:

1. An aerial view of the city and nearby mountains.
2. A shaded relief map showing some political features.
3. A road map.
4. A topographic map.
5. A terrain model, or three-dimensional drawing, created by USGS from computerized data.

Also, by showing these *different* maps of the same place, the poster clearly illustrates the *decision-making* process that goes into mapmaking.

A key teaching point is that *there can be many different kinds of maps for the same place*. It's not possible to show everything about a place on one map and still make it understandable and easy to read. So mapmakers have developed many different kinds of maps.

As students work with the poster, they will learn that the map they choose to work with depends on the kind of information they need.

Another key teaching point is that *the legend is the key to the map*. To understand the purpose of a particular map, students need to know how to read the legend. To make the point very clear, each map on the poster has an enlarged legend.

What's included in the lessons?

Each lesson contains step-by-step lesson plans, and "hands-on" student activity sheets, that incorporate information about maps into existing curriculum objectives in geography and social studies.

Lesson 1 helps students think about maps they have seen and are familiar with. Then the lesson introduces them to the picture and maps on the teaching poster.

Lesson 2 provides some basic information students need to know to read maps: direction, latitude and longitude, and scale.

Lesson 3 helps students realize that different maps can highlight different characteristics of a particular location. The legend is the key to unlocking the secrets of a map.

Lesson 4 is about **topographic maps**. It helps students understand how a two-dimensional map can represent a three-dimensional surface.

This teacher's package also includes a map packet—reproducible masters of the maps shown on the poster. Before teaching the first lesson, make a copy of each of the maps for your students. The map packet will be used in several of the lessons.

Teaching methodology

Suggested in this teaching package are a number of different inquiry strategies you can use with students. This type of teaching is particularly appropriate in the social studies. Students will be asked to look at the data presented on the maps and draw some conclusions. In some cases, they will need to use data from more than one map to find the answers.

This helps them develop higher order thinking skills by manipulating data in several maps to make comparisons between them. Lesson plans use a variety of strategies that appeal to different learning styles. The teachers' guide for each lesson shows you how the information relates to the five key geographic concepts.

Summary of the five geographic concepts

The five geographic concepts developed by the Joint Committee on Geographic Education of the National Council for Geographic Education and the American Association of Geographers are articulated in Guidelines for Geographic Education, Elementary and Secondary schools.

The five concepts represent the types of questions geographers use as they strive to understand and define the Earth—for geography provides us with a system for asking questions about the Earth.

1. Location: position on the Earth's surface

Look at a map. Where are places located? To determine location, geographers use a set of imaginary lines that crisscross the surface of the globe. Lines designating "latitude" tell us how far north or south of the equator a place is. Lines designating "longitude" measure distance east and west of the prime meridian—an imaginary line running between the North Pole and the South Pole through Greenwich, England.

You can use latitude and longitude as you would a simple grid system on a State highway map. The point where the lines intersect is the "location"—or global address. For example, St. Louis, Missouri is roughly at 39° (degrees) north latitude and 90° west longitude.

Directions

Children need to understand positional words. Words like "above" and "below" can be taught in a natural way when you give them directions. "Right" and "left" are as much directional terms as north, south, east and west. Other words that describe such features as color, size, shape are also important in learning direction.

2. Place: physical and human characteristics

Every place has a personality. What makes a place special? What are the physical and cultural characteristics of your hometown? Is the soil sandy or rocky? Is the temperature warm or is it cold? If it has many characteristics, which are the most distinct?

How do these characteristics affect the people living there? People change the character of a place. They speak a particular language, have styles of government and architecture, and form patterns of business. How have people shaped the landscapes?

Help children understand their own neighborhood. Point out differences and similarities to other places. Help children understand various types of buildings and their uses. Are their features built to conform with the weather or topography? Do the shapes of some buildings indicate how they were used in the past or how they are used now?

Show children the historical, recreational, or natural points of interest in your town. What animals and plants live in your neighborhood? If you are near a national park, a lake, a river, or a stream, help children understand how it has affected the character of your town.

3. Relationships with places: humans and environments

How do people adjust to their environment? What are the relationships among people and places? How do they change it to better suit their needs?

Geographers examine where people live, why they settled there, and how they use natural resources. For example, Hudson Bay, the site of the first European settlement in Canada, is an area rich in wildlife and has sustained a trading industry for hundreds of years. Yet the climate there was described by early settlers as "nine months of ice followed by three months of mosquitoes." People can and do adapt to their natural surroundings.

Controlling our surroundings

Everyone controls his or her surroundings. Children can see how the furniture is arranged in their home. Furniture is placed to suit the shape of rooms and according to how people will use it.

Ask children to consider what the yard would look like if it were not changed by mowing the grass, raking the leaves, or planting shrubs or trees. What would happen if you did not water the plants?

Ask children what would happen if we did not pick up litter. How to dispose of waste is a problem with a geographic dimension.

Describe to children how people have shaped their environment—bonsai gardens, reservoirs, terracing, or houses built into hills. Tell them how and why these phenomena came to be.

Explain to children that farmers use soil, water and sun to grow food. They use ponds or streams for water and build fences to keep animals from running away.

People do not always change their environment. Sometimes they are shaped by it. Often people must build roads around mountains. They build bridges over rivers. They construct storm walls to keep the ocean from sweeping over beaches. In some places near the coasts people build their houses on stilts to protect them from storm tides or periodic floods.

Ask children if they did not have a faucet with running water, where would they live.

4. Movement: people interacting on Earth

People are scattered over the Earth. How do they get from one place to another? What are the patterns of movement of people, products, and information? Regardless of where we live, we rely upon each other for goods and information.

Most people interact with other places almost every day. We depend on other places for food, clothes, and even items like pencils. We share information with each other using telephones, newspapers, radio and television to bridge the distances.

Different ways to travel

Ask children if they have been on an airplane, a train, a subway, a ferry, a barge, a horse, a carriage. Use a map to look at various routes for different methods of transportation.

Follow the movement of people and things

Tell children to look at home and see where things come from. Examine the labels of the clothes you wear. Where does your food come from? Why do bananas come from Central America? Why does your milk come from a local dairy? Is your climate too cold to raise bananas? Is milk too perishable to travel far?

Ask children where their ancestors came from. Use maps to find countries of family origins. Why did their ancestors leave their original homes?

Tell children to ask older relatives what the world was like when they were young. What did they wear? What did they use for transportation? What did they eat? Ask children to look at old family pictures. Ask them how things have changed since their grandmother was a child.

Follow the movement of ideas and information

Ideas come from beyond our immediate surroundings. How do they get to us? Remind children of telephone, mail, television, radio, telefax, posters, bumper stickers, as some of the many ways we convey information from one person or place to another. Ask children what are other ways of getting information. Ask children how they communicate with other people. Will they write a letter? Will they make a telephone call? Have children write a letter.

5. Regions: how they form and change

How can places be described or compared? How can the Earth be divided into regions for study? Geographers categorize regions in two basic ways—physical and cultural. Physical regions are defined by landform (continents and mountain ranges), climate, soil, and natural vegetation. Cultural regions are distinguished by political, economic, religious, linguistic, agricultural and industrial characteristics.

Help children understand physical regions by examining areas in the school—the classroom, the hallways, the cafeteria, the coatroom. Have children describe their town. Are their neighborhoods around the hills, the waterfront? Ask children if there are "regions" in their homes. Are there "physical" regions in their town?

Examine cultural regions

Tell children about different political, residential, recreational, ethnic, and commercial regions of the city. Tell children about different customs of people around the world and your city.

Talk about costumes, holidays, foods, coins, stamps, money.

Teach children simple words in different languages, such as "hello," "thank you," and "goodbye." Teach them to count to ten in other languages.

If you have foreign teachers at your school, ask them to visit your class and talk about their home and the customs.

In conclusion

Geography is a way of thinking, of asking questions, of observing, and of appreciating the world around us.

The U.S. Geological Survey

The U.S. Geological Survey (USGS) was established as a bureau of the Department of the Interior in 1879. For more than 100 years, the USGS carried on an extensive program of mapping to investigate the natural resources of the nation.

The USGS is the prime source of many kinds of topographic and special purpose maps of the United States and its territories. It is also a prime source of digital map data. All USGS maps are compiled to exacting standards of accuracy and content.

The USGS cooperates with agencies of other governments in distributing map information and map products internationally. USGS resources and expertise are made available to foreign governments through cooperative agreements and through the United Nations.

The USGS makes available to the public both basic map data and a family of general purpose maps. As these products are intended for a wide variety of uses—industrial, scientific, commercial, educational, and recreational—the maps are designed to satisfy a broad range of public needs. Maps depicting topography, geology and recreational use of national forests, parks and refuges, among many other maps, are available from the USGS.

For more information, call 1-800-USA-MAPS.

USGS materials suitable for elementary school:

- Helping Your Child Learn Geography
- Finding Your Way with Map and Compass
- Types of Maps
- Catalog of Maps

1993

Lesson 1—Introduction to Maps

Key points

- There can be many different maps of the same place.
- Not all information about a place can be put on one piece of paper.
- For maps to communicate, they focus on showing a limited number of things.

How this lesson relates to the geographic themes

Location—where things are—is the most fundamental geographic concept. The first task in geography is to locate places. Maps are the tools students need to accomplish this task. This lesson also helps students understand that there are many different kinds of maps.

Place—physical and human characteristics—is another key concept in geography. All places on Earth have distinctive characteristics that give them meaning and character, and that help distinguish them from other places.

As students learn about Salt Lake City, a city near both a lake and mountains, they will start to understand that physical characteristics make a place unique.

Geography involves not only learning the location of places, but analyzing *why* the place is there: the interaction of physical, climatic, economic, and historical factors. Spatial analysis is the cornerstone of geography, and maps are the principal tools in performing that analysis.

Materials you need for this lesson

1. A copy of Activity Sheet #1 for each student.
2. Your class social studies textbook.

Suggestions for teaching this lesson *(2, 30-minute sessions)*

1. To begin the lesson, ask students to list all the different kinds of maps they have ever seen or used. Write the list on the board. It might include:

A road map

A political map

A shaded relief map

A topographic map

A map showing products from a State or region

A map showing the weather (either in the newspaper or on television)

A map on a television news program

A map showing the routes of an explorer

A map showing how different States voted in an election

A map featuring the agricultural products of different States or regions

2. Using either your own social studies textbook or a variety of texts, have students work in groups for 5 to 10 minutes to look through their textbooks. Have them list the kinds of maps they find on their activity sheet.

3. Ask students why there are so many different kinds of maps. The conclusion they should come to is that you can't display everything about a place on one piece of paper. So for a map to communicate clearly, it must show a limited number of things.

4. Have students look at the poster. Say, "We are going to use this poster to help us understand some of the major kinds of maps."

Ask students to look at the large photograph of Salt Lake City and environs. You may want to bring them up in groups of five or six to see the details more clearly.

Ask students to describe what they see. You may want to direct their comments to make sure they notice a variety of geographic features—the mountains, the city, highways, the State capitol building, etc.

5. Now direct the students' attention to the different maps on the poster. Say, "Here are several different maps of the Salt Lake City area. Each shows a different thing."

Have them write down one or two things that they can learn from each of the maps. (The next lesson focuses on specific skills needed to read, understand, and use maps.)

Talk a little bit with students about what they have learned. Tell them the next lesson will help them learn more about maps.

Additional activities for follow-up

1. Develop a bulletin board showing as many different types of maps as possible. Have the students cut out maps from magazines and newspapers and bring them to schooi to put on the bulletin board.

2. Ask students to watch the evening news for three or four nights. Have them list all the maps they see on the news and what they show.

Lesson 2—Some Things You Need to Know to Read a Map

Key teaching points

- Mapmakers use north, south, east, and west to describe direction.
- Mapmakers usually orient their maps to show north at the top.
- It is possible to describe the relationship of one place to another. One place is north, south, east, or west of another place. This kind of orientation is known as **relative location**.
- Using longitude and latitude, a grid of imaginary lines created by geographers, it is possible to identify the **absolute location** of any point on the Earth's surface.
- The relationship between a distance on the map and the corresponding distance on the ground is known as **scale**.
- Using the distance scale, it is possible to determine the actual distance on the ground between two points shown on a map.
- Geographers use the terms "large-scale" and "small-scale" to describe the amount of area on the ground covered by a map. A large-scale map shows a small land area in great detail. A small-scale map shows less detail, but a larger land area.

How this lesson relates to the geographic themes

Location—This lesson focuses on developing skills students need to understand location—where things are. It helps students understand both absolute and relative location. Absolute location refers to the system of latitude and longitude used to designate a point on the Earth's surface.

Relative location includes understanding what direction one point is from another, as well as how to orient yourself from one map to another and from a photograph to a map.

Materials you need for this lesson

1. A globe.
2. A copy of the map packet for each student.
3. A copy of Activity Sheet #2 for each student.

For this lesson, you will be teaching students information derived from the poster and the maps in the map packet. You'll also be asking them questions based on the poster and the maps. Have them follow along with the maps and their activity sheets, filling in the answer to each question as it's answered by the class. This will help students learn from each other. At the end of the class, every student will have a correctly filled-in activity sheet.

Suggestions for teaching this lesson *(2, 30-minute sessions)*

Pass out Activity Sheet #2. Ask students to take out the map packet. Tell students they'll use all three maps to complete this lesson. You'll be teaching students three basic concepts in this lesson: *Understanding direction*, including orienting a picture to a map; *Understanding latitude and longitude*; and *Understanding scale*.

Understanding direction

1. *Review north, south, east, and west.* Refer to your classroom globe. Say, "Notice that north is at the top of the globe, south at the bottom. When talking about north on a map, geographers mean going toward the North Pole.

When talking about south on a map, they mean going toward the South Pole. When creating maps, mapmakers generally use the same orientation for their maps—with north at the top.

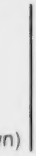
Draw on the board the symbol mapmakers typically use to show north, south, east, and west.

Say, "This is the orientation of almost every map you'll see, including the maps on this poster."

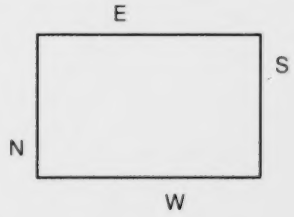
2. *Help students orient a map to the picture of a place.* Students should use their **shaded relief maps**. You have just told your students that maps are usually oriented with north at the top. But when a photograph is taken of a place, it isn't always taken looking north. Students should learn how to orient a picture of a place to the directions on the map.

Have the students look at the picture of Salt Lake City on the poster. Have a student come up to the poster and run a finger along the mountain range in the picture, which goes in this direction: ——— (left to right)

Now have students find and run their fingers along the Wasatch Mountains on the **shaded relief map**. They go in this direction:



Point out that this is the same mountain range. Then ask the students to look at the picture on the poster, then look at the map, and tell you where north is on the picture.



Have students put an X on the place on the **shaded relief map** that shows where the photographer was standing to take the picture. Ask, "In what direction was the photographer looking when the picture was taken?" *(Answer: southeast)*

3. *Have students practice finding locations using directions.* It will take students a few minutes to find these locations on their **shaded relief maps**.

You might want to turn it into a game. When one student finds a location, ask him or her to describe the location to the rest of the class.

Ask students to answer these questions and fill in their answers on Activity Sheet #2:

- On your **shaded relief map**, which town is farthest north? *(Answer: Willard)*
- Which town is farthest south? *(Answer: Orem)*
- Which towns are farthest east? *(Answers: Woodland, Upton, Wahsatch)*
- Which town is farthest west? *(Answer: Ophir)*

4. *Talk about relative location.* Say, "You can use north, south, east, and west to talk about where one place on a map is in relationship to another." On the poster picture and on the **shaded relief map**, point out Salt Lake City. Then point out the Great Salt Lake on the **shaded relief map**.

Ask students, "Which direction is the Great Salt Lake from Salt Lake City?" (Another way to say this is, "If you were standing in Salt Lake City and looking at the Great Salt Lake, what direction would you be looking?") *(Answer: west)*

Ask students to answer these questions and fill in their answers on Activity Sheet #2:

- If you were going from Ogden to Sandy, what direction would you travel? *(Answer: south)*
- If you were going from Farmington Bay to Willard Reservoir, what direction would you travel? *(Answer: north)*

Point out that not everything is directly north, south, east, and west of another point. To better describe the location of one place, introduce students to four additional directional markings—northeast, southeast, southwest, and northwest. Add these directions to the symbol you have drawn on the board.

Ask students to answer these questions and fill in their answers on Activity Sheet #2:

- Echo Reservoir is _____ of Salt Lake City. *(Answer: northeast)*
- Great Salt Lake State Park is _____ of Salt Lake City. *(Answer: northwest or west)*
- Deer Creek Lake State Recreation Area is _____ of Salt Lake City. *(Answer: southeast)*
- West Valley City is _____ of Salt Lake City. *(Answer: southwest)*

Point out that direction can also be applied to linear features like rivers or railroads.

Ask students to answer these questions and fill in their answers on Activity Sheet #2:

- What direction do the Wasatch Mountains run? *(Answer: north-south or south-north)*
- What direction does Echo Canyon run? *(Answer: southwest-northeast or northeast-southwest)*

Features like the canyons and mountain ranges mentioned above can be described with either direction first. When describing rivers, however, the direction is from the source of the river to the mouth.

More map practice. Then ask students to choose other locations on the map, asking each other questions about which direction they would travel to go from one to the other. (They will not write these answers on their activity sheets.) It is important for students to be comfortable looking at a map and understanding directions.

Understanding latitude and longitude

1. *Review latitude and longitude with your students.* Students will be using their **topographic maps**. You might say, "Points of latitude and longitude are imaginary lines created by mapmakers to allow them to pinpoint any place on the globe or map." Have the students find the latitude and longitude markings on the **topographic map**.

Notice that *degrees* of latitude and longitude can be further subdivided into minutes and then into seconds. Ask them to guess how many seconds of longitude are in a minute. *(The answer is 60.)* Point out that these subdivisions of a degree allow geographers to be precise in stating a location. The **topographic map** lists Salt Lake City's location in degrees, minutes, and seconds.

Ask students to answer these questions and fill in their answers on Activity Sheet #2:

- In what direction do latitude lines run? *(Answer: east-west)* Longitude lines? *(Answer: north-south)*
- What are the latitude and longitude of Salt Lake City? *(Answer: 40° 46' N, 111° 53' W)*

2. *More on latitude and longitude.* Have students use a globe. Ask them to follow Salt Lake City's latitude line around the globe. Ask them to find two or three other cities found at roughly the same latitude. *(Possible answers: Beijing, China; Ankara, Turkey; Madrid, Spain)*

Have the students follow the longitude line. Ask the students to find a capital of a Canadian province that is closest to the longitude of Salt Lake City. *(Answer: Edmonton, Alberta)*

Following the longitude line south on the globe, which country does it pass through before reaching the Pacific Ocean? *(Answer: Mexico)*

Working with scale

1. *Explain scale to students.* Students will be using all three maps. You might say, "In order to see how large a piece of the globe your map pictures, the first thing to do is to look at the scale of the map. The scale of the map describes the relationship between a distance on the map and the corresponding distance on the ground. Maps have different scales. Each map on this poster has a different scale. Let's work with these maps to learn more about scale and what it does."

Have the students place the maps with their legends on their desks in the following order: shaded relief map on the left, road map in the center, and topographic map on the right.

First, have the students look at the legend for the **shaded relief map**. Ask them to locate the distance scale shown in the legend.

Ask students to answer this question and fill in the answer on Activity Sheet #2:

■ What is the scale of this map? *(Answer: 1:500,000)*

Tell the students that this means that 1 inch on the map equals 500,000 inches on the ground, or that 1 centimeter on the map equals 500,000 centimeters on the ground.

Now find the scale of the **road map**.

Ask students to answer this question and fill in the answer on Activity Sheet #2:

■ What is the scale of this map? *(Answer: 1:1,000,000)*

Find the scale of the topographic map. Ask students to answer this question and fill in the answer on Activity Sheet #2.

■ What is the scale of this map? *(Answer: 1:24,000)*

2. *Large- and small-scale maps.* To help students compare one map with another, have them find the State capitol on all three maps and circle it. First, have the students look at the **topographic map**. Ask, "What other buildings can you see on this map?" *(Answers may include a hospital, several schools, the City and County Building, and Temple Square. Draw their attention to the oil refinery storage tanks in the northwest corner of the **topographic map**.)*

Next, have students look at the **road map**. "Can you see any of the buildings that are shown on the **topographic map** on this map?" Again, draw their attention to the refinery storage tanks. This gives them a clear understanding of how much more detail the large-scale **topographic map** includes. Ask students if they can find any of these buildings on the **shaded relief map**. *(Answer: no)*

Now have students find the Great Salt Lake on the **shaded relief map**. A considerable area of the lake is shown in the northwest corner of the map.

Then have them find the lake on the **road map**. They can see the lake in the northwest section of the map. Ask them now to look at the **topographic map**. They cannot see any of the lake on this map.

You might say, "A large-scale map, such as the **topographic map**, shows a small land area in considerable detail. But the small-scale **shaded relief map** shows less detail, but a larger land area."

3. *Using the distance scale to determine distance.* One reason many people use maps is to determine the distance between two places. Each map has its own distance scale printed on it. Using the distance scale, students can determine the distance between two points.

Say, "We're going to measure distances from the State capitol building."

Have the students locate the State capitol on their **road map**. Have them locate the town of Sandy. *(Almost directly south)*

Ask students to answer these questions and fill in the answers on Activity Sheet #2.

■ Using your rulers, measure the distance on your **road map** between the State capitol and the town of Sandy. What is the distance on the map? *(Answer: 1")*

Use the distance scale to determine the distance between the capitol and Sandy. What distance does that 1" represent? *(Answer: 16 miles)*

Have students repeat this activity on the **shaded relief map**.

Ask students to answer these questions and fill in the answers on Activity Sheet #2.

■ Using your rulers, measure the distance on the **shaded relief map** between the State capitol and Sandy. What is the distance? *(Answer: 2")*

■ Use the distance scale to determine the distance between the capitol and Sandy. What distance does that 2" represent? *(Answer: about 16 miles)*

Because the scales of the **road map** and the **shaded relief map** are different, they will measure a different distance between the two points. However, even though the distances on the maps are different (2 inches versus 1 inch) the distance on the ground that those measurements cover is the same.
(Answer: about 16 miles)

Additional activities for follow-up

1. Have the students use encyclopedias and other reference works to learn more about Utah. See how many other kinds of maps you can find.

Make a display bulletin board of the various maps that are available for the same place.

2. Show students north, south, east, and west by using the school as a reference point. (Perhaps they can see the sun only in the morning or in the afternoon.)

3. Bring in a variety of maps of the United States, your State, and your community. Help the students see that the larger the scale, the more detailed the map can be.

4. Have students create their own maps of your school or classroom. Allow them to choose their own scale for these maps. Afterwards, compare the level of detail that can be shown on a larger-scale map.

Lesson 3—What You Can Learn From a Map

Key teaching points

■ The legend is the key to unlocking the secrets of a map.

■ Different maps highlight different physical and man-made features of a particular location. Mapmakers choose to emphasize different characteristics depending on the intended use of the map.

■ A **road map** shows people how they can travel from one place to another. It also shows some physical boundaries, such as mountains and rivers; political features, such as States and counties; and populated places, such as cities, towns, and villages.

■ A **shaded relief map** is designed to highlight the physical features of a place. It portrays relative elevations.

■ A **topographic map** shows the elevation of the land at all points, so the reader can learn the absolute elevation of any given place.

■ You can learn more about a place by looking at several different maps of that place.

How this lesson relates to the geographic themes

Location—This lesson helps students understand more about the primary tool that geographers use to communicate information about a location—maps.

Place—Throughout this lesson, students will examine the characteristics of Salt Lake City (mountains, rivers, roads, trails) and its surrounding area. They will then look at several maps to see how those characteristics are represented.

Materials you need for this lesson

1. A map packet for each student.
2. A copy of Activity Sheet #3 for each student.

During this lesson, students will be working with the black-and-white maps in their map packet, as well as going to the board for information from the maps on the color poster. Have students follow along with the maps and their activity sheets, filling in the answer to each question on their activity sheet or marking on their maps. This will help students learn from each other. At the end of the class, every student will have a correctly filled-in activity sheet.

Suggestions for teaching this lesson *(2, 30-minute sessions)*

As your students have learned, there are many different kinds of maps. This lesson focuses on three basic types of maps—a **road map**, a **shaded relief map**, and a **topographic map**.

1. *Pass out Activity Sheet #3.* Ask students to take out their map packets. Tell students they will be using all three maps to complete this lesson. Ask them to follow along, filling in their activity sheets and marking on their maps.

2. *Identify characteristics of Salt Lake City.* Ask the students to look closely at the picture of Salt Lake City on the poster. Using the picture, point out some of the most important things about this city. It's the capital of Utah; point out the capitol building. It has a mountain range to the east; show students the Wasatch Mountains. It is a large city; help students locate the tall buildings. The city is the world headquarters for the Church of Jesus Christ of Latter-day Saints; the Mormon Tabernacle is located just a few blocks from the State capitol building. If you have a United States map in your classroom, show students the location of Salt Lake City. It is one of the chief centers of finance, industry, and transportation in the Rocky Mountain States.

3. *Show students what they can learn from each map.*

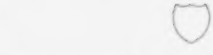
Legends. Tell the students, "All of the features we have just identified are shown on at least one of these maps. How can we understand the details of what those maps show? By using the legend on each map. You might not have realized it, but when we did Lesson 1, you used the legend to see what the maps in your book showed. In this lesson, we're going to look at legends in more detail."

4. *Help students understand the information on the* **road map**. Ask students to turn to their **road map** and Activity Sheet #3. Begin with the **road map**, since it is the map that most students will have seen. To help orient themselves, ask the students to find the State capitol in the center of Salt Lake City. Have them circle it on their map if they have not already done so for Lesson 2.

Have students look at the things listed on the legend for the **road map**.

Ask students to answer these questions and fill in their answers on Activity Sheet #3 and on their road maps:

■ Find and draw the map symbol for an interstate highway route marker.



■ Find and draw the map symbol for a State highway route marker.

■ Ask students to locate an interstate highway. *(Possible answers: I–80, I–84, I–15, I–215)*

■ Ask students to locate a State highway. *(Many possible answers)*

■ Ask the students to find a road that goes into the mountains. Trace it on the **road map** with your pencil. *(Several possible answers)*

■ Why are there fewer roads northeast of the city? *(Answer: Because the area is mountainous.)*

Ask a student to go to the poster to answer these questions for their classmates. (Students can't use their map packets because they are printed in black-and white.)

Ask students to answer these questions and fill in their answers on Activity Sheet #3:

■ What colors are highways? *(Answer: red, green, or blue)*

■ The areas around a city are shown in color on the map. What color is used for Salt Lake City? *(Answer: yellow)*

■ What color is used for bodies of water? *(Answer: blue)*

5. Help students understand the information on the **shaded relief map**. Have students look at the **shaded relief map** in the map packet. **Shaded relief maps** look the most like a picture, and are easy for students to understand. Say, "**Shaded relief maps** are designed to highlight the physical features of a place. The shading shows how a particular area looks with sunlight shining on it from a particular direction."

Ask students to find some mountains and valleys. Trace them with their fingers.

Have students notice the water in the top left hand section of the map. Say, "This is the edge of the Great Salt Lake—a huge inland body of water."

Ask students to answer these questions and fill in their answers on Activity Sheet #3 and their shaded relief maps:

■ Draw a line down the ridge (backbone) of the Wasatch Mountains.

■ Locate a canyon on the map. What is its name? *(Answer: Echo Canyon, East Canyon, American Fork Canyon)*

■ What do you see at the bottom of a canyon? *(Answer: rivers or creeks)*

Where does the water in those rivers and creeks come from? *(Answer: snow or rain)*

■ Have students use the legend to find the symbol for airport

and the State capitol

■ What direction is the airport from the State capitol? *(Answer: west)*

The legend shows city size. Using the legend, the population of Salt Lake City is between _____ and _____. *(Answer: 100,000 and 500,000)*

The population of Ogden is between _____ and _____. *(Answer: 50,000 and 100,000)*

■ Have the students find a town with a population of 500 to 1,000. *(Many answers)*

Point out to your students that every map's legend is different. On this map, for example, city size is shown by printing the name larger or smaller. On other maps, city size might be shown by using different symbols.

Ask students to answer these questions and fill in the answers on Activity Sheet #3:

■ What are the major colors on the map? What does each color represent? *(Answers: blue, water; green, lowland; brown, mountains; red, roads)*

More map practice. Ask students to determine the pattern of population in this part of Utah—where are most of the large cities located? (west of the Wasatch Mountains) You can tell your students that more than three-fifths of the State's population live in the Salt Lake City-Ogden metropolitan area.

6. *Help students understand the information on the* **topographic map**. A **shaded relief map** shows height through shading. The **topographic map** uses **contour lines** to show elevation (height above sea level.)

Because a **shaded relief map** looks something like a picture, it is often easier for students to use. A **topographic map** also shows elevations, but it may be harder to understand because it uses contour lines. (This kind of map can be difficult for students to use because it requires them to visualize a third dimension. This teaching package includes a lesson on reading **topographic maps**.)

Ask the students to look at the **topographic map**. Say, "This **topographic map** shows a small area of Salt Lake City and the nearby mountains. You will be drawing some lines and making some notations on this map."

7. *Contour lines.* Show students the thin, wiggly lines on this map. Tell them that these are *contour lines.* Say, "Contour lines join points of equal elevation above a specified reference, such as sea level. Think of a contour line as an imaginary line on the ground that takes any path necessary to maintain constant elevation."

Have the students make these markings on their **topographic maps**:

Ask students to run their pens or pencils along the entire 5,000' contour line on the **topographic map**. (It's just north of the State capitol.) Then have them run their pens or pencils along another contour line. This will give them a feeling for the shape of the land.

When the contour lines are close together, the ground is steep. Ask students to put an X on the map on a steep hill. When contour lines are farther apart, the ground is less steep. Ask students which is steeper—the area to the north or south of the police firing range? *(Answer: the ground is steeper to the north of the range)*

A **topographic map** shows actual elevations. Ask students to draw a circle around the highest elevation number they can find. *(Answer: 5,600 feet at the top of the map)*

Ask students to answer these questions and fill in the answers on Activity Sheet #3 and their topographic map:

■ Find and draw the symbol for a school. Draw a circle around a school on the map.

■ How high is Ensign Peak? *(Answer: 5,414 feet)*

■ Find the jeep trail northwest of the State capitol. At about what elevation is the trail? *(Answer: about 4,800 feet)*

Why do you think it's a jeep trail instead of a regular road? *(Answer: Mountainside is too steep to fit width of a road.)*

■ Find and draw the symbol for railroad.

Point out that in the northwestern part of the **topographic map**, there are many railroad symbols bunched together.

These represent railroad sidings where trains come in and wait to be loaded. Tell the students that the symbols near the railroad sidings are oil and salt tanks. They are located next to the railroads to make it easy for the oil and salt to be loaded onto the trains and transported to other parts of the country. As students can see from this **topographic map**, Salt Lake City is a major railroad center.

Have a student go to the colored **topographic map** on the poster and answer these questions about the map for their classmates:

Ask students to answer these questions and fill in the answers on Activity Sheet #3:

■ What is the color used for rivers or creeks? *(Answer: blue and purple)*

■ What colors are highways? *(Answer: red and purple)*

8. *Wrap-up discussion.* Lead students in a brief discussion that gets them to think about *why* there are different kinds of maps. You might say, "Now we have worked with three different kinds of maps—a **road map**, a **shaded relief map**, and a **topographic map**. These different maps all show the same area—Salt Lake City. The maps are different because the mapmakers designed each map for a different purpose."

Divide the students into groups of three or four. Have them pretend they are cartographers. Have them be prepared to answer these questions for the class:

"As a cartographer, I created the **road map** to show_____.

I created the **shaded relief map** to show_____.

I created the **topographic map** to show_____."

Additional activities for follow-up

Involve students in brainstorming: What other kinds of maps of the Salt Lake City area could you make? Why might you as a mapmaker decide they were needed? Encourage students to be imaginative—a map of mineral deposits, a map showing voting patterns, a map showing good ski areas, a map showing population density, etc.

Lesson 4—How to Read a Topographic Map

Key teaching points

A **topographic map** is a representation of a three-dimensional surface on a flat piece of paper. The digital elevation model on the poster is helpful in understanding **topographic maps.**

Contour lines, sometimes called "level lines," join points of equal elevation. The closer together the contour lines appear on a **topographic map**, the steeper the slope (assuming constant contour intervals).

Topographic maps have a variety of uses, from planning the best route for a hike to determining a location for a school or an airport.

How this lesson relates to the geographic themes

Location and place—Using a **topographic map** can give students a clear understanding of the physical and man-made characteristics of a location. The **topographic map** allows for a clear understanding of such physical features as mountains and canyons.

Relationships within places—Using the **topographic map**, students can see why some things are where they are. They can see how people have adapted to the physical characteristics of a particular location.

Movement—Students can begin to understand how the topography of a location influences the transportation and communication within that area and with the rest of the world.

Materials you need for this lesson

A copy of Activity Sheet #4 for each student.

Suggestions for teaching this lesson *(3, 35-minute sessions)*

On the poster is a **topographic map** of Salt Lake City. This lesson will help students learn how to read that map. Learning to use a **topographic map** is a difficult skill, because it requires students to visualize a three-dimensional surface from a flat piece of paper. Students need both practice and imagination to learn to visualize hills and valleys from the contour lines on a **topographic map**.

A digital terrain model of Salt Lake City is shown on the poster. This three-dimensional drawing, created from computerized data, is a helpful transition step for students as they learn to visualize the shape of the land from contour lines.

1. *Discuss the word "topographic."* Remind students that there are many different types of maps. Tell them that they are going to learn about a specific type of map—the **topographic map**. Begin the lesson by introducing students to the word "topographic." Write the word on the board. Tell students the word is derived from two Greek words—"topo," meaning "place," and "graphos," meaning "drawn or written." Ask students if they can use that information to figure out what "topographic" might mean. Then ask a student to look up the word in the dictionary to see whether the guess was correct.

2. *Hand out Activity Sheet #4.* The top illustration introduces students to contour lines. Point out that a contour line joins points of equal elevation. Think of it as an imaginary line on the ground that takes any path necessary to maintain constant elevation.

First, have the students look at the side view of the hills. (Bottom of the illustration).

Ask students to answer these questions and fill in their answers on Activity Sheet #4:

- Which is higher, hill A or hill B? *(Answer: hill B)*

- Which is steeper, hill A or hill B? *(Answer: hill B)*

3. *Compare a **topographic map** to a picture of the same place.* Now have the students look at the **topographic map** of the same two hills. Say, "The lines you see on this map are called contour lines. Can you see why they are sometimes called 'level lines'?" Ask the students to trace with their fingers around the 40' contour line on the map. Then ask them to look at the picture of the hill and draw their fingers around the 40' contour line.

Then ask the students to draw their fingers along the 20' contour line on the **topographic map**. Then draw their fingers along the 20' line on the picture of the hill. This exercise will help those students who are kinesthetic learners.

Ask students to answer this question and fill in the answer on Activity Sheet #4:

- How many feet of elevation are there between contour lines? *(Answer: 10')*

Show the students that some contour lines are thicker than others. These "index contours" include labels to make it easier to read elevations from the maps.

Ask students to answer these questions and fill in the answers on Activity Sheet #4:

- How high is hill A? *(Answer: about 42')* Hill B? *(Answer: about 54')*

- Are the contour lines closer together on hill A or hill B? *(Answer: hill B)*

Help students understand that the closer the lines, the steeper the slope. Have students point out other places on the map that have a very steep slope.

4. *Introduce students to other information shown on a* ***topographic map****.* Now have the students look at the picture on page 2 of the activity sheet.

Have students identify and circle these features on the illustration on page 2 of Activity Sheet #4:

- A church
- A bridge over the river
- An oceanside cliff
- A stream that flows into the main river
- A hill that rises steeply on one side and more smoothly on the other.

Have students identify and circle the same features on the topographic map on page 2 of Activity Sheet #4.

- Draw the map symbol for a church.

- Draw the map symbol for a bridge.

- Put an X on the oceanside cliff.
- What is the elevation of the contour line at the top of the cliff? *(Answer: 100')*
- Locate a stream that flows into the main river. Draw a pencil line down that stream. Put an X where the stream joins the main river. On a real **topographic map**, streams are shown in blue and contour lines are shown in brown.

5. *Discuss how* ***topographic maps*** *are used.* Maps are developed for special purposes. **Topographic maps** are used in a variety of ways.

Ask students to answer the following questions and fill in their answers on Activity Sheet #4:

How might you use a topographic map if you were selecting:

- A route for a hike. *(Choose route that's not too steep. When planning a long hike, you may want to see whether water is available or whether it should be carried in. Woods tint may indicate whether the route is shaded.)*
- The best location for an airport. *(Make sure airplanes have plenty of room to take off and land before the ground rises. Do not let students suggest building in a swamp, in the woods, or in a built-up area.)*
- A route for a new road. *(Find a shallow grade rather than a steep one. Do not allow them to cross too many rivers because bridges are expensive.)*

6. *Working with the* ***topographic map*** *in the map packet.* Now that your students have a basic understanding of how **topographic maps** work, here are some questions to ask them about the **topographic map** in their map packet:

- What is the approximate elevation of the State capitol? *(Answer: 4,500')*

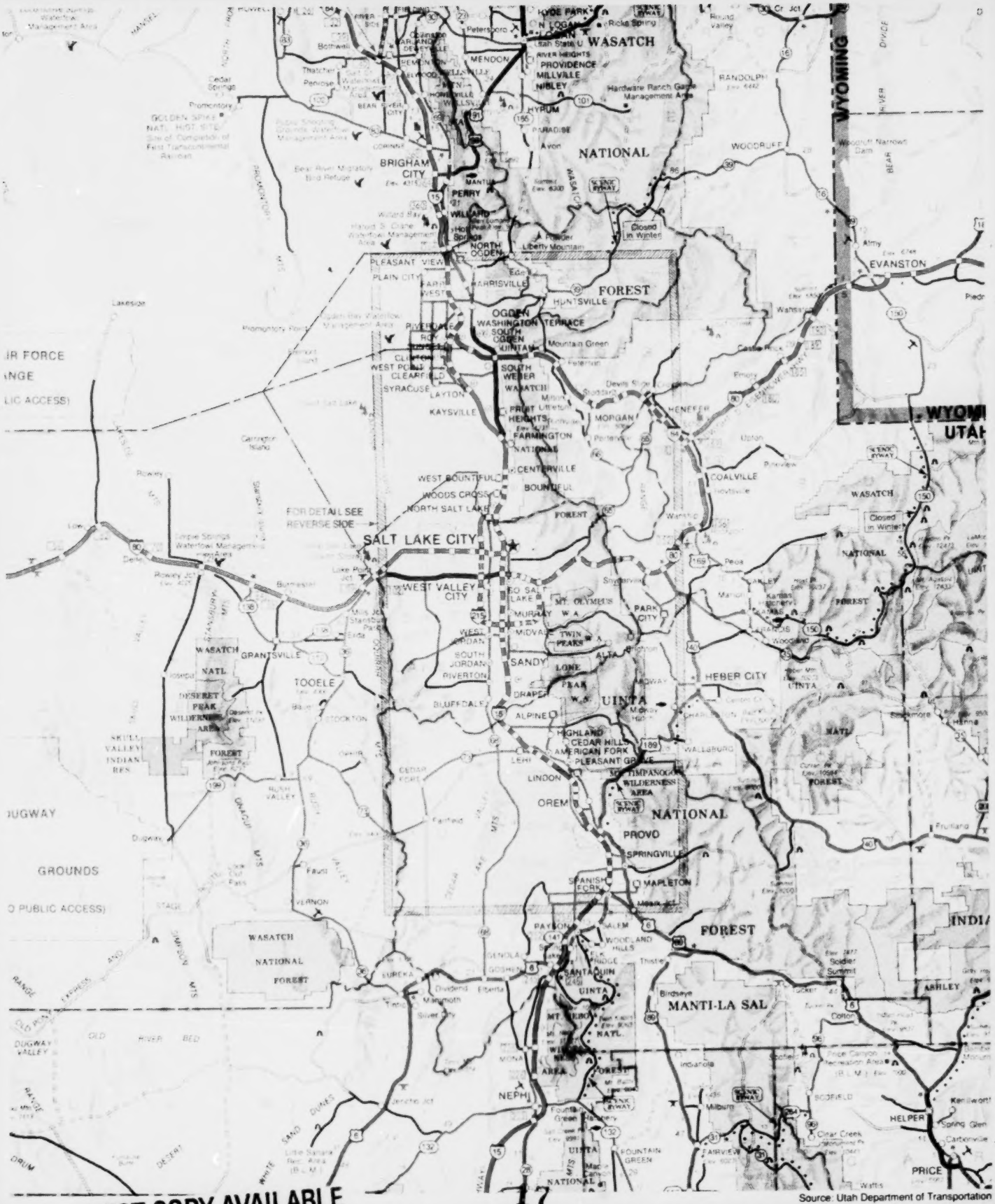
Would you be walking uphill or downhill to go from the State capitol to Pioneer Park? *(Answer: downhill)*

- Suppose you lived by Fremont School. Find at least three ways you could get from your house to the State capitol. List things you would see along the way.

Additional activities for follow-up

1. The **topographic map** shows that Salt Lake City has a Pony Express Monument near the State capitol. Have your students learn more about the Pony Express and why this monument is located in Salt Lake City.

Road Map


WASATCH
NATIONAL
FOREST
WYOMING
EVANSTON
BRIGHAM CITY
PERRY
WILLARD
NORTH OGDEN
PLEASANT VIEW
PLAIN CITY
HARRISVILLE
FARR WEST
HUNTSVILLE
OGDEN
WASHINGTON TERRACE
SOUTH OGDEN
UINTAH
RIVERDALE
ROY
CLINTON
WEST POINT
CLEARFIELD
SYRACUSE
LAYTON
KAYSVILLE
SOUTH WEBER
WASATCH
FRUIT HEIGHTS
FARMINGTON
CENTERVILLE
BOUNTIFUL
WEST BOUNTIFUL
WOODS CROSS
NORTH SALT LAKE
SALT LAKE CITY
WEST VALLEY CITY
MURRAY
MIDVALE
SANDY
SOUTH JORDAN
RIVERTON
WEST JORDAN
TOOELE
GRANTSVILLE
DRAPER
ALPINE
BLUFFDALE
LEHI
LINDON
OREM
PROVO
SPRINGVILLE
SPANISH FORK
MAPLETON
PAYSON
SANTAQUIN
MANTI-LA SAL
HELPER
PRICE
NEPHI
HEBER CITY
PARK CITY
COALVILLE
MORGAN
HENEFER
MOUNTAIN GREEN
OGDEN
UINTA
ALTA
SNOWBIRD
BRIGHTON
SOLITUDE
ALTA
DEER VALLEY
PARK CITY
WOODLAND HILLS
SOLDIER SUMMIT
ASHLEY
FAIRVIEW
FOUNTAIN GREEN
MT. NEBO
WILDERNESS AREA
DESERET PEAK WILDERNESS AREA
TIMPANOGOS WILDERNESS AREA
LONE PEAK WILDERNESS AREA
SKULL VALLEY INDIAN RES.
GOSHUTE INDIAN RES.
GOLDEN SPIKE NATL. HIST. SITE
Site of Completion of First Transcontinental Railroad
Bear River Migratory Bird Refuge
Willard Bay State Recreation Area
Harold S. Crane Waterfowl Management Area
Great Salt Lake Shorelands Preserve
Great Salt Lake Waterfowl Management Area
Locomotive Springs Waterfowl Management Area
Hardware Ranch Game Management Area
Causey Reservoir
Wahsatch Narrows Dam
Closed in Winter
Liberty Mountain
Powder
Snowbasin
Nordic Valley
Ogden Valley
Pineview Reservoir
Monte Cristo
Huntsville
Eden
Ogden Canyon
Ogden River
Weber River
Bear River
Provo River
Jordan River
Great Salt Lake
Antelope Island
Fremont Island
Carrington Island
Promontory
Promontory Point
Lakeside
Corinne
Bothwell
Thatcher
Penrose
Cedar Springs
Petersboro
Ricks Spring
Hyde Park
North Logan
Logan
Utah State U
River Heights
Providence
Millville
Nibley
Hyrum
Paradise
Avon
Mendon
Wellsville
Hyrum Reservoir
Randolph
Woodruff
Bear River Divide
Almy
Piedmont
Lyman
Mountain Green
Peterson
Devils Slide
Porterville
Morgan
Henefer
Echo Reservoir
Rockport Reservoir
Wanship
Coalville
Wasatch
Closed in Winter
Kamas
Oakley
Peoa
Francis
Woodland
Hoytsville
Snyderville
Parley's Canyon
Mt. Olympus
Twin Peaks
Lone Peak
Draper
Alpine
Highland
Cedar Hills
American Fork
Pleasant Grove
Lehi
Lindon
Orem
Provo
Springville
Spanish Fork
Mapleton
Payson
Woodland Hills
Santaquin
Eureka
Dividend
Mammoth
Silver City
Tintic
Goshen
Genola
Benjamin
Salem
Thistle
Soldier Summit
Birdseye
Cotton
Indianola
Scofield
Clear Creek
Spring Glen
Carbonville
Kenilworth
Wellington
Castle Gate
Sunnyside
Wattis
Fruitland
Duchesne
Myton
Roosevelt
Vernal
Fort Duchesne
Uintah
Ouray
Fairfield
Cedar Fort
Fairfield
Stockton
Grantsville
Tooele
Skull Valley
Dugway
Dugway Valley
Old River Bed
Sand Dunes
White Sand
Little Sahara Rec. Area (B.L.M.)
Fountain Green Recovery
Mac
Wasatch National Forest
Uinta National Forest
Manti-La Sal National Forest
Wasatch Natl. Forest
Uinta Natl. Forest
Mt. Nebo Wilderness Area
Timpanogos Wilderness Area
Deseret Peak Wilderness Area
Lone Peak Wilderness Area
Skull Valley Indian Res.
Goshute Indian Res.
Golden Spike Natl. Hist. Site

Road Map Legend

Road
Scale 1:1,000,000
One inch equals approximately 16 miles

0 16 32 Miles

0 10 20 Kilometers

State capitol:

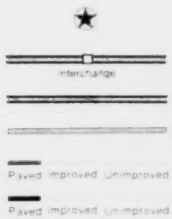
Interstate highway:

Multilane divided highway:

Principal through highway:

Other highway:

Local road:



County boundary:

Route markers—
interstate; U.S.; State:

Built up area; locality; elevation:

Airport:

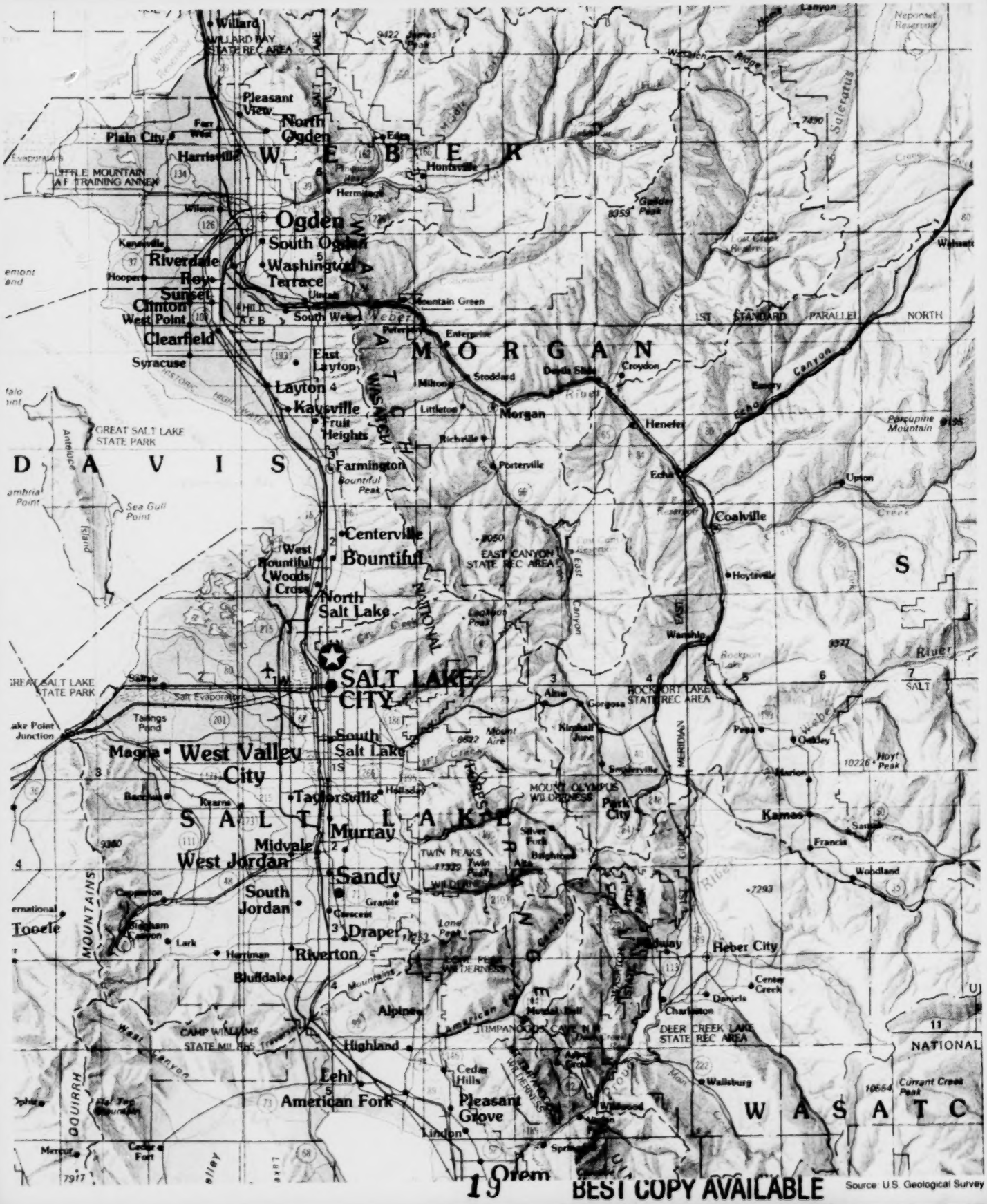
Campsite:

Rest area:

Population key

SALT LAKE CITY	100,000 to 500,000
OGDEN	50,000 to 100,000
Milton	500 to 1,000

Shaded Relief Map



Source U.S. Geological Survey

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Shaded Relief Map Legend

Shaded Relief
Scale 1:500,000
One inch equals approximately 8 miles

10 0 10 20 30 Miles

10 0 10 20 30 40 50 Kilometers

Contour interval 500 Feet

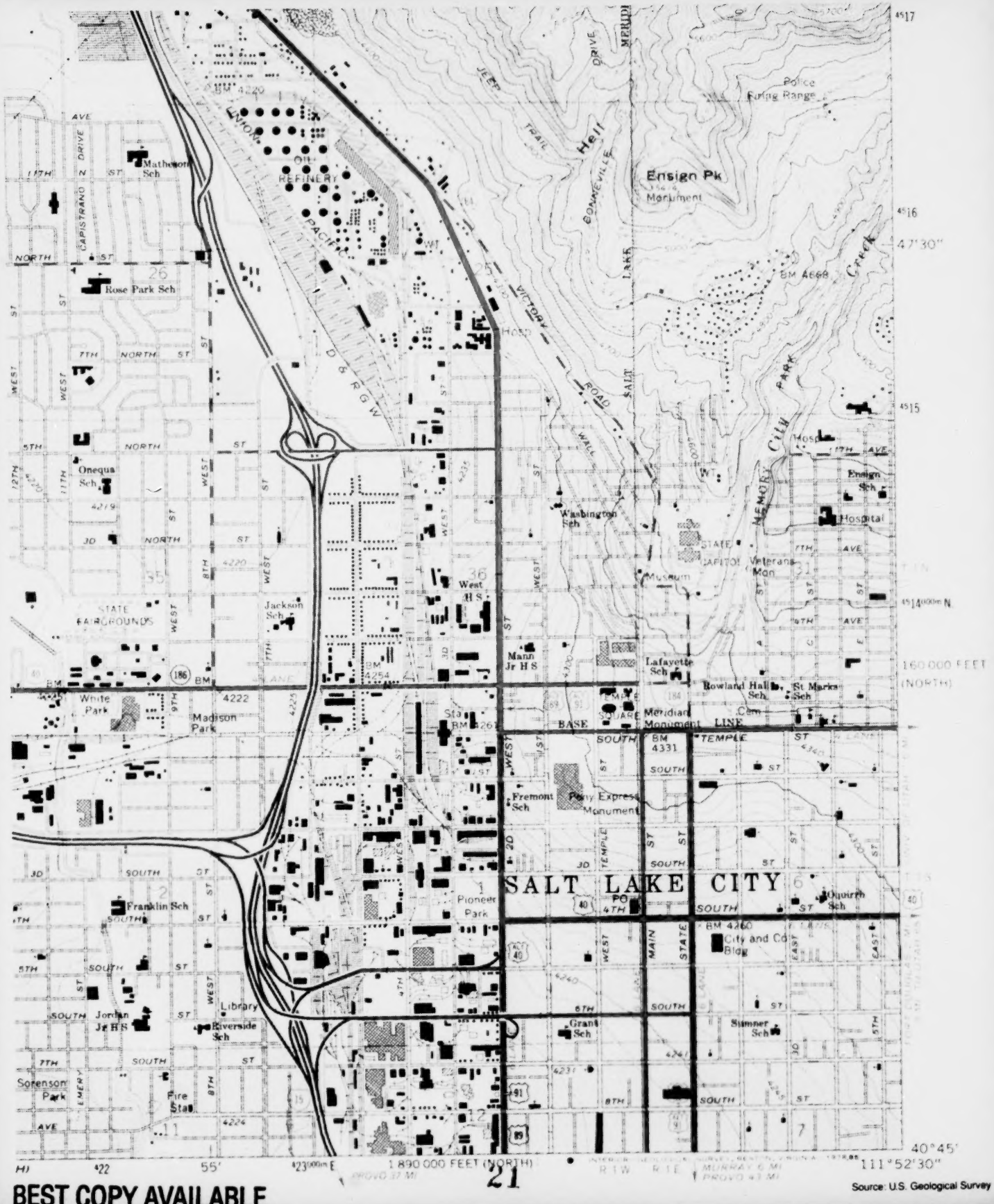
State capitol:
School:
Hospital:

Airport:
Route markers—
interstate; U.S.; State:

Population key

• **SALT LAKE CITY**	100,000 to 500,000	• **Draper**	5,000 to 25,000
◉ **Ogden** (county seat)	50,000 to 100,000	◉ **Heber City** (county seat)	1,000 to 5,000
		• **Henefer**	500 to 1,000
• **Murray**	25,000 to 50,000	• **Daniels**	up to 500

Topographic Map



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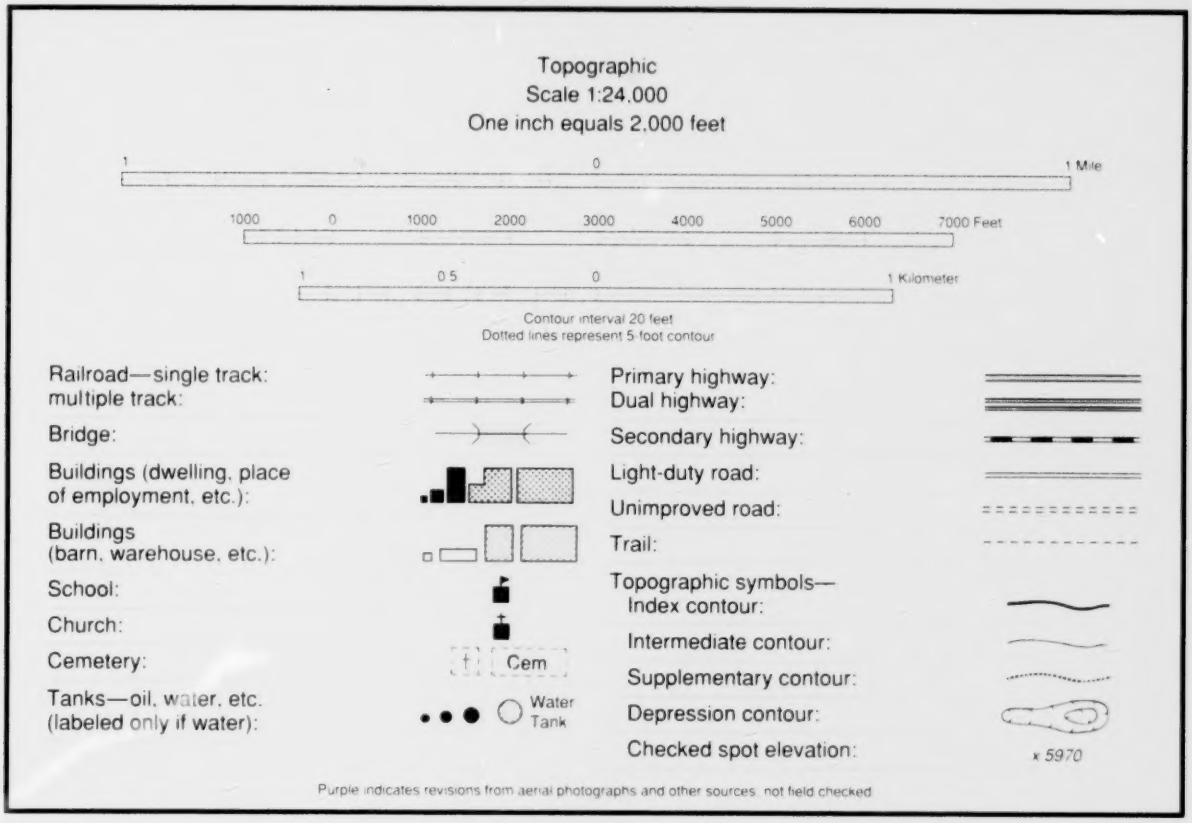
Source: U.S. Geological Survey

Topographic Map Legend



Activity Sheet #1—Introduction to Maps

There are many different maps for the same place. Not all information about a place can be displayed on one piece of paper. For maps to communicate, they must focus on showing a limited number of things.

Look through your social studies or geography textbook. List the different kinds of maps that are included.

Type of map	What the map shows	Name of textbook	Page #

Which did you think was most interesting?

In the next lesson, you'll learn a lot more about how a legend is the key to unlocking the secrets of a map.

What are the maps on the teaching poster?
What do you think each map shows?

Type of map	What the map shows

Activity Sheet #2—Some Things You Need to Know to Read a Map

Fill in the answers to these questions as you learn more about what you need to know to read a map.

Working with direction

You can use north, south, east, and west to talk about where one place on a map is in relationship to another.

Look at the **shaded relief map** to answer these questions:

On this map, which town is farthest north? _____

Which town is farthest south? _____

Which towns are farthest east? _____

Which town is farthest west? _____

If you were going from Ogden to Sandy, what direction would you travel? _____

If you were going from Farmington Bay to Willard Reservoir, what direction would you travel? (Hint: These are both parts of the Great Salt Lake.) _____

Echo Reservoir is _____ of Salt Lake City.

Great Salt Lake State Park is _____ of Salt Lake City.

Deer Creek Lake State Recreation Area is _____ of Salt Lake City.

West Valley City is _____ of Salt Lake City.

What direction do the Wasatch Mountains run?

What direction does Echo Canyon run?

Latitude and longitude

Lines of latitude and longitude represent an imaginary grid that mapmakers have developed so they can pinpoint any place on a globe or map.

Using your **topographic map**, find the latitude and longitude markings.

In which direction do latitude lines run?

In which direction do longitude lines run?

What are the latitude and longitude of Salt Lake City?

Working with scale

The scale of the map describes the relationship between a distance on the map and the corresponding distance on the ground. Maps have different scales.

Look at the legend for the **shaded relief map**. What is the scale of this map?

Now look at the **road map**. What is the scale of this map?

Look at the **topographic map**. What is the scale of this map?

Using the distance scale

Using your ruler, measure the distance on your **road map** between the State capitol and the town of South Salt Lake. The distance is

Using the distance scale on the **road map**, figure out how many miles it is from the State capitol to Sandy.

Now locate the State capitol on the **shaded relief map**.

Using your ruler, measure the distance on your **shaded relief map** between the State capitol and the town of Sandy. The distance is

Using the distance scale on the **shaded relief map**, figure out how many miles it is from the State capitol to Sandy.

Your answers should be the same! Can you explain why?

Activity Sheet #3—What You Can Learn From a Map

There are different maps for different purposes. In this lesson, you'll learn more about the special uses of three maps—a **road map**, a **shaded relief map**, and a **topographic map.** Remember, the legend is the key to unlocking the secrets of a map.

Road maps

Road maps show people how they can travel from one place to another. They also show some physical features, such as mountains and rivers, and political features, such as cities and towns.

Find and draw the map symbol for an interstate highway route marker.

Find and draw the map symbol for a State highway route marker.

Locate an interstate highway.

Locate a State highway.

Find a road that goes into the mountains.
Trace it on your road map with your pencil.

Why do you think are there so few roads northeast of the city?

Use the colored road map on the poster to answer these questions:

What colors are highways?

The areas around a city are shown in color on the map.
What color is used for Salt Lake City?

What color is used for bodies of water?

Shaded relief maps

Shaded relief maps are designed to highlight the physical features of a place. The shading shows how a particular area looks with sunlight shining on it from a particular direction.

On your **shaded relief map**, draw a line down the ridge (backbone) of the Wasatch Mountains.

Locate a canyon on the map. What is its name? _____

What do you see at the bottom of a canyon? _____

Where does the water in those rivers and creeks come from? _____

Find and draw the symbol for airport.

Which direction is the airport from the State capitol? _____

The legend shows city size. Using the legend, the population of Salt Lake City is between _____ and _____.

The population of Ogden is between _____ and _____.

Find a town with a population of 500 to 1,000. _____

Use the **shaded relief map** on the poster to answer these questions:

What are the major colors on the map? _____

What does each color represent? _____

Topographic maps

The **topographic map** uses contour lines to show elevation (height above sea level). Contour lines join points of equal elevation above a specified reference, such as sea level.

Think of a contour line as an imaginary line on the ground that takes any path necessary to maintain constant elevation. Run your pen or pencil along the entire 5,000' contour line on your **topographic map**. Then run your pen or pencil along another contour line. This will help you feel the shape of the land.

When the contour lines are close together, the ground is steep. Put an X on your map on a steep area.

Which is steeper, the area to the north or south of the police firing range?

Find and draw a symbol for a school.

Draw a circle around a school on the map.

How high is Ensign Peak?

What is the elevation of the jeep trail northwest of the State capitol?

Draw the symbol for railroad.

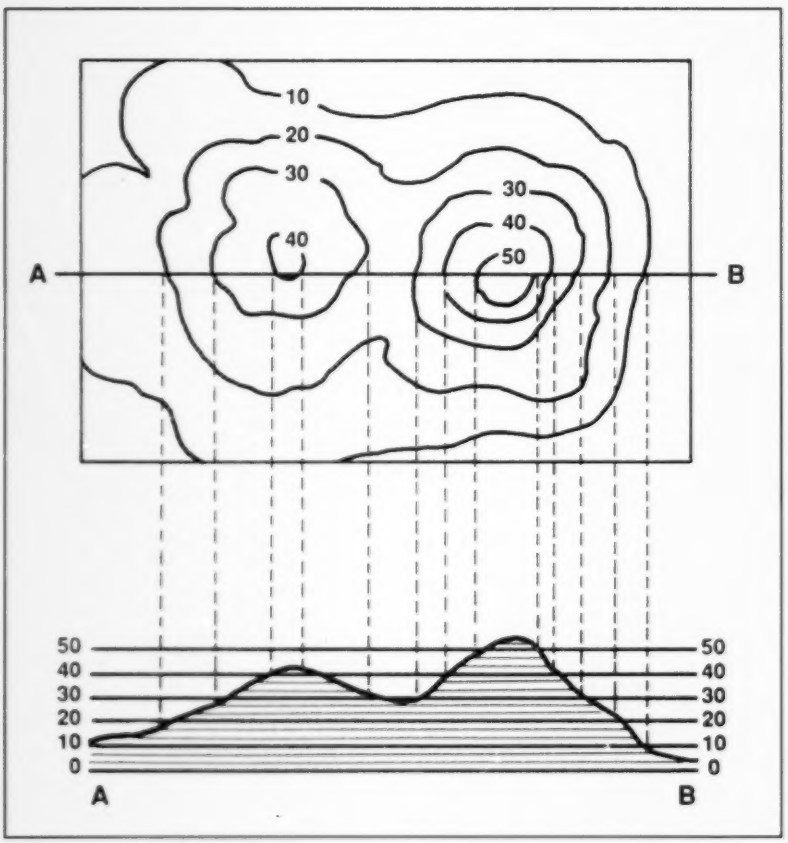
Using the **topographic map** on the poster, answer these questions:

What is the color used for rivers or creeks?

What colors are highways?

Activity Sheet #4—How to Read a Topographic Map

One special kind of map is called a **topographic map**. It has **contour** lines to show the shape and elevation of the land. They are sometimes called "level lines" because they show points that are at the same level. Here's how contour lines work:



The top of this drawing is a contour map showing the hills that are illustrated at the bottom.

On this map, the vertical distance between each contour line is 10 feet.

1. Which is higher, hill A or hill B?

2. Which is steeper, hill A or hill B?

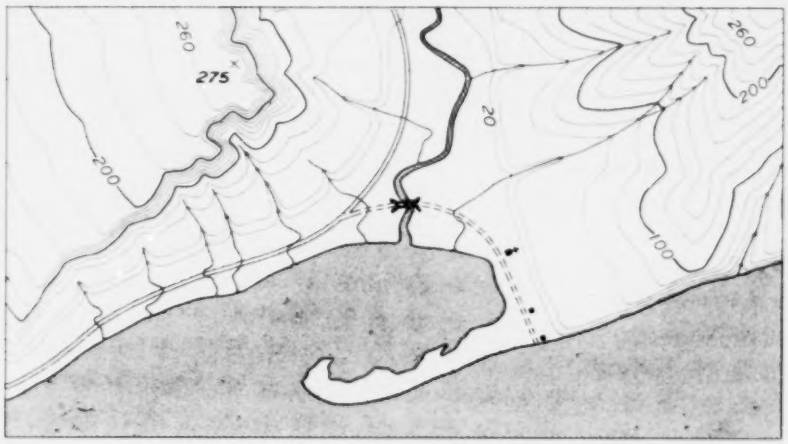
3. How many feet of elevation are there between contour lines?

4. How high is hill A? Hill B?

5. Are the contour lines closer together on hill A or hill B?

Look at this picture. It shows a river valley and several nearby hills. On the illustration, locate the following things:

- A church
- A bridge over the river
- An oceanside cliff
- A stream that flows into the main river
- A hill that rises steeply on one side and more smoothly on the other.



Here is a **topographic map** of the same place. Find the items you located on the illustration on the topographic map.

Circle the symbol for a church.

Draw a church symbol here.

Put a square around the map symbol for a bridge.

Draw a bridge symbol here.

Put an X on the oceanside cliff.

What is the elevation of the contour line at the top of that cliff? _____

Locate a stream that flows into the main river. Draw a pencil line down that stream. Put an X where the stream joins the main river. On a real **topographic map**, streams are shown in blue and contour lines are shown in brown.

Find the hill that rises steeply on one side and more smoothly on the other. On the **topographic map**, draw a path up the gentler slope of the hill to the highest point. (Hint: remember that when contour lines are close together, the ground is very steep.) Draw a path showing a very steep way up the hill.

Tell how you might use a **topographic map** if you were selecting:

1. A route for a hike.

2. The best location for an airport.

3. A route for a new road.

Use the **topographic map** in your map packet to answer these questions:

What is the approximate elevation of the State capitol?

Would you be walking uphill or downhill to go from the State capitol to Pioneer Park?

Suppose you lived by Fremont School. Find at least three ways you could get from your house to the State capitol.

List things you would see along the way.